

## Environmental Protection Agency

## § 1065.750

### § 1065.725 High-level ethanol-gasoline blends.

For testing vehicles capable of operating on a high-level ethanol-gasoline blend, create a test fuel as follows:

(a) Add ethanol to an E10 fuel meeting the specifications described in § 1065.710 until the ethanol content of the blended fuel is between 80 and 83 volume %.

(b) You may alternatively add ethanol to a gasoline base fuel with no ethanol if you can demonstrate that such a base fuel blended with the proper amount of ethanol would meet all the specifications for E10 test fuel described in § 1065.710, other than the ethanol content.

(c) The ethanol used for blending must be either denatured ethanol meeting the specifications in 40 CFR 80.1610, or fuel-grade ethanol with no denaturant. Account for the volume of any denaturant when calculating volumetric percentages.

(d) The blended test fuel must have a dry vapor pressure equivalent between 41.5 and 45.1 kPa (6.0 and 6.5 psi) when measured using the procedure specified in § 1065.710. You may add commercial grade butane as needed to meet this specification.

[79 FR 23811, Apr. 28, 2014]

### § 1065.740 Lubricants.

(a) Use commercially available lubricating oil that represents the oil that will be used in your engine in use.

(b) You may use lubrication additives, up to the levels that the additive manufacturer recommends.

### § 1065.745 Coolants.

(a) You may use commercially available antifreeze mixtures or other coolants that will be used in your engine in use.

(b) For laboratory testing of liquid-cooled engines, you may use water with or without rust inhibitors.

(c) For coolants allowed in paragraphs (a) and (b) of this section, you may use rust inhibitors and additives required for lubricity, up to the levels that the additive manufacturer recommends.

### § 1065.750 Analytical gases.

Analytical gases must meet the accuracy and purity specifications of this section, unless you can show that other specifications would not affect your ability to show that you comply with all applicable emission standards.

(a) Subparts C, D, F, and J of this part refer to the following gas specifications:

(1) Use purified gases to zero measurement instruments and to blend with calibration gases. Use gases with contamination no higher than the highest of the following values in the gas cylinder or at the outlet of a zero-gas generator:

(i) 2% contamination, measured relative to the flow-weighted mean concentration expected at the standard. For example, if you would expect a flow-weighted CO concentration of 100.0  $\mu\text{mol/mol}$ , then you would be allowed to use a zero gas with CO contamination less than or equal to 2.000  $\mu\text{mol/mol}$ .

(ii) Contamination as specified in the following table:

TABLE 1 OF § 1065.750—GENERAL SPECIFICATIONS FOR PURIFIED GASES<sup>1</sup>

Constituent	Purified air	Purified N <sub>2</sub>
THC (C <sub>1</sub> -equivalent) .....	$\leq 0.05 \mu\text{mol/mol}$ .....	$\leq 0.05 \mu\text{mol/mol}$ .
CO .....	$\leq 1 \mu\text{mol/mol}$ .....	$\leq 1 \mu\text{mol/mol}$ .
CO <sub>2</sub> .....	$\leq 10 \mu\text{mol/mol}$ .....	$\leq 10 \mu\text{mol/mol}$ .
O <sub>2</sub> .....	0.205 to 0.215 mol/mol .....	$\leq 2 \mu\text{mol/mol}$ .
NO <sub>x</sub> .....	$\leq 0.02 \mu\text{mol/mol}$ .....	$\leq 0.02 \mu\text{mol/mol}$ .
N <sub>2</sub> O <sup>2</sup> .....	$\leq 0.02 \mu\text{mol/mol}$ .....	$\leq 0.02 \mu\text{mol/mol}$ .

<sup>1</sup> We do not require these levels of purity to be NIST-traceable.

<sup>2</sup> The N<sub>2</sub>O limit applies only if the standard-setting part requires you to report N<sub>2</sub>O or certify to an N<sub>2</sub>O standard.

(2) Use the following gases with a FID analyzer:

(i) *FID fuel*. Use FID fuel with a stated H<sub>2</sub> concentration of (0.39 to 0.41)

mol/mol, balance He or N<sub>2</sub>, and a stated total hydrocarbon concentration of 0.05  $\mu\text{mol/mol}$  or less. For GC-FIDs that measure methane (CH<sub>4</sub>) using a FID

fuel that is balance N<sub>2</sub>, perform the CH<sub>4</sub> measurement as described in SAE J1151 (incorporated by reference in § 1065.1010).

(ii) *FID burner air*. Use FID burner air that meets the specifications of purified air in paragraph (a)(1) of this section. For field testing, you may use ambient air.

(iii) *FID zero gas*. Zero flame-ionization detectors with purified gas that meets the specifications in paragraph (a)(1) of this section, except that the purified gas O<sub>2</sub> concentration may be any value. Note that FID zero balance gases may be any combination of purified air and purified nitrogen. We recommend FID analyzer zero gases that contain approximately the expected flow-weighted mean concentration of O<sub>2</sub> in the exhaust sample during testing.

(iv) *FID propane span gas*. Span and calibrate THC FID with span concentrations of propane, C<sub>3</sub>H<sub>8</sub>. Calibrate on a carbon number basis of one (C<sub>1</sub>). For example, if you use a C<sub>3</sub>H<sub>8</sub> span gas of concentration 200 µmol/mol, span a FID to respond with a value of 600 µmol/mol. Note that FID span balance gases may be any combination of purified air and purified nitrogen. We recommend FID analyzer span gases that contain approximately the flow-weighted mean concentration of O<sub>2</sub> expected during testing. If the expected O<sub>2</sub> concentration in the exhaust sample is zero, we recommend using a balance gas of purified nitrogen.

(v) *FID CH<sub>4</sub> span gas*. If you always span and calibrate a CH<sub>4</sub> FID with a nonmethane cutter, then span and calibrate the FID with span concentrations of CH<sub>4</sub>. Calibrate on a carbon number basis of one (C<sub>1</sub>). For example, if you use a CH<sub>4</sub> span gas of concentration 200 µmol/mol, span a FID to respond with a value of 200 µmol/mol. Note that FID span balance gases may be any combination of purified air and purified nitrogen. We recommend FID analyzer span gases that contain approximately the expected flow-weighted mean concentration of O<sub>2</sub> in the exhaust sample during testing. If the expected O<sub>2</sub> concentration in the exhaust sample is zero, we recommend using a balance gas of purified nitrogen.

(3) Use the following gas mixtures, with gases traceable within ±1% of the NIST-accepted value or other gas standards we approve:

- (i) CH<sub>4</sub>, balance purified air and/or N<sub>2</sub> (as applicable).
- (ii) C<sub>2</sub>H<sub>6</sub>, balance purified air and/or N<sub>2</sub> (as applicable).
- (iii) C<sub>3</sub>H<sub>8</sub>, balance purified air and/or N<sub>2</sub> (as applicable).
- (iv) CO, balance purified N<sub>2</sub>.
- (v) CO<sub>2</sub>, balance purified N<sub>2</sub>.
- (vi) NO, balance purified N<sub>2</sub>.
- (vii) NO<sub>2</sub>, balance purified air.
- (viii) O<sub>2</sub>, balance purified N<sub>2</sub>.
- (ix) C<sub>3</sub>H<sub>8</sub>, CO, CO<sub>2</sub>, NO, balance purified N<sub>2</sub>.
- (x) C<sub>3</sub>H<sub>8</sub>, CH<sub>4</sub>, CO, CO<sub>2</sub>, NO, balance purified N<sub>2</sub>.
- (xi) N<sub>2</sub>O, balance purified air and/or N<sub>2</sub> (as applicable).

(4) You may use gases for species other than those listed in paragraph (a)(3) of this section (such as methanol in air, which you may use to determine response factors), as long as they are traceable to within ±3% of the NIST-accepted value or other similar standards we approve, and meet the stability requirements of paragraph (b) of this section.

(5) You may generate your own calibration gases using a precision blending device, such as a gas divider, to dilute gases with purified N<sub>2</sub> or purified air. If your gas divider meets the specifications in § 1065.248, and the gases being blended meet the requirements of paragraphs (a)(1) and (3) of this section, the resulting blends are considered to meet the requirements of this paragraph (a).

(b) Record the concentration of any calibration gas standard and its expiration date specified by the gas supplier.

(1) Do not use any calibration gas standard after its expiration date, except as allowed by paragraph (b)(2) of this section.

(2) Calibration gases may be relabeled and used after their expiration date as follows:

- (i) Alcohol/carbonyl calibration gases used to determine response factors according to subpart I of this part may be relabeled as specified in subpart I of this part.

(ii) Other gases may be relabeled and used after the expiration date only if we approve it in advance.

(c) Transfer gases from their source to analyzers using components that are dedicated to controlling and transferring only those gases. For example, do not use a regulator, valve, or transfer line for zero gas if those components were previously used to transfer a different gas mixture. We recommend that you label regulators, valves, and transfer lines to prevent contamination. Note that even small traces of a gas mixture in the dead volume of a regulator, valve, or transfer line can diffuse upstream into a high-pressure volume of gas, which would contaminate the entire high-pressure gas source, such as a compressed-gas cylinder.

(d) To maintain stability and purity of gas standards, use good engineering judgment and follow the gas standard supplier's recommendations for storing and handling zero, span, and calibration gases. For example, it may be necessary to store bottles of condensable gases in a heated environment.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37343, June 30, 2008; 74 FR 56518, Oct. 30, 2009; 75 FR 68465, Nov. 8, 2010; 76 FR 57467, Sept. 15, 2011; 79 FR 23811, Apr. 28, 2014]

#### § 1065.790 Mass standards.

(a) *PM balance calibration weights.* Use PM balance calibration weights that are certified as NIST-traceable within 0.1% uncertainty. Calibration weights may be certified by any calibration lab that maintains NIST-traceability. Make sure your highest calibration weight has no greater than ten times the mass of an unused PM-sample medium.

(b) *Dynamometer calibration weights.* [Reserved]

[70 FR 40516, July 13, 2005, as amended at 76 FR 57467, Sept. 15, 2011]

### Subpart I—Testing With Oxygenated Fuels

#### § 1065.801 Applicability.

(a) This subpart applies for testing with oxygenated fuels. Unless the standard-setting part specifies otherwise, the requirements of this subpart

do not apply for fuels that contain less than 25% oxygenated compounds by volume. For example, you generally do not need to follow the requirements of this subpart for tests performed using a fuel containing 10% ethanol and 90% gasoline, but you must follow these requirements for tests performed using a fuel containing 85% ethanol and 15% gasoline.

(b) Section 1065.805 applies for all other testing that requires measurement of any alcohols or carbonyls.

(c) This subpart specifies sampling procedures and calculations that are different than those used for non-oxygenated fuels. All other test procedures of this part 1065 apply for testing with oxygenated fuels.

#### § 1065.805 Sampling system.

(a) Dilute engine exhaust, and use batch sampling to collect proportional flow-weighted dilute samples of the applicable alcohols and carbonyls. You may not use raw sampling for alcohols and carbonyls.

(b) You may collect background samples for correcting dilution air for background concentrations of alcohols and carbonyls.

(c) Maintain sample temperatures within the dilution tunnel, probes, and sample lines high enough to prevent aqueous condensation up to the point where a sample is collected to prevent loss of the alcohols and carbonyls by dissolution in condensed water. Use good engineering judgment to ensure that surface reactions of alcohols and carbonyls do not occur, as surface decomposition of methanol has been shown to occur at temperatures greater than 120 °C in exhaust from methanol-fueled engines.

(d) You may bubble a sample of the exhaust through water to collect alcohols for later analysis. You may also use a photoacoustic analyzer to quantify ethanol and methanol in an exhaust sample as described in §1065.269.

(e) Sample the exhaust through cartridges impregnated with 2,4-dinitrophenylhydrazine to collect carbonyls for later analysis. If the standard-setting part specifies a duty cycle that has multiple test intervals (such as multiple engine starts or an engine-off soak phase), you may proportionally